HSL No. 74-5
March 26, 1974
THIS ISSUE CONTAINS:
HS-013 833-842; HS-013 848-898; HS-800 813; 906-907; 911; 928; 951-956; 965-966; 972; 976; 978; 983; 992
HS-801 015; 017; HS-820 293; 306

U.S. Department of Transportation
National Highway Traffic Safety Administration

HighwaySafetyLiteratur

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SAE: Society of Automotive Eng neers, Dept. HSL, 2 Pennsylvan Plaza, New York, N.Y. 10001. **Ord by title and SAE report numbers.**

HRB: Highway Research Boar National Academy of Sciences, 21(Constitution Ave., N.W., Washingto D.C. 20418.

Material directly related to Highway and/or Motor Vehicle Safety is solicited for inclusion in Highway Safe Literature. Topics must fall within the scope of the mission of the National Highway Traffic Safety Administratic Submit material, together with a written statement of approval for publication to:

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A document containing several articles is announced as complete volume under an HS number referring to it as a whole. Entries for individual articles are listed under their own HS numbers.

SAMPLE ENTRIES

JOURNAL ENTRY

Title of Document

SYNTHESIS OF CASE LAW JURISPRUDENCE RELATING TO WET-WEATHER HIGHWAY CONDITIONS

Journal Citation

Highway Research Record n 376 p29-36 (1971)

Author(s)

D. C. Oliver 1971

Sponsored by Highway Res. Board Steering Com. for Workshop on Anti-Skid Program Management and presented at the workshop.

Search Terms

Descriptors: *Liability, *Negligence, *Accident responsibility, *Legal responsibility, *Wet road conditions, *Court decisions, *State government, *Skidding accidents, *Warning signs, *Highway maintenance, *Litigation, *Icy road conditions,

Abstract

The extant case law on legal liability for accidents occurring on icy and wet highways has established three central areas and one subarea in the jurisprudence of maintenance liability. These areas are compliance with general duties in order to escape liability; damages resulting from noncompliance (negligence); contributory negligence as a bar to recovery; and advisory signing as a technique in meeting general duties. Court decisions covering these four areas are presented.

NHTSA Accession Number

HS-012 289

*Subject heading in Subject Index

CONTRACT REPORT

EQUIPMENT AND PROCEDURES FOR MEASURING GLARE FOR MOTOR VEHICLES. FINAL REPORT

Corporate author

Teledyne Brown Engineering

N. E. ChattertonJ. D. HayesE. W. George 1972 102p

Contract DOT-HS-089-1-139

Availability

NTIS

Descriptors: *Glare, *Glare reduction, *Visual perception, *Photometers, *Luminance, *Hydraulic equipment, *Central vision, *Field of view, *Backgrounds, *Contrast, *Light conditions, *Brightness, *Test facilities, *Test equipment, *Vehicle safety standards, *Simulators, *Light, *Reflectance, *Measuring instruments,

A procedure and description of equipment for measuring glare from a driver's own vehicle are presented. The procedures are based on a disability glare theory as applied to foveal vision. Two pieces of apparatus were constructed to provide the measurement capability. One of them simulates diffuse sky glare and the other simulates direct solar glare. Methods of combining data from these measurements are presented along with scaling laws selected to provide a value for glare as it would be under natural daylight conditions. A standard for allowable glare levels from the vehicle is developed which is independent of the measurement procedure. Test results from a passenger car are presented and compared with this standard. Recommendations for improvements to the apparatus and additional research requirements for improvement to the theory are made.

HS-800 731

ACCIDENTS

. Emergency Services

TTLEFIELD STRATEGY FOR CIVILIAN TRAUMA RE

rnal of American Insurance v49 n3 p5-9 (Fall 1973)
onymous 1973
serial citation

ergency medical services, Radio communication, Emergen- reporting systems, Medical treatment, Accident hospitals, dical emergencies, Medical case reports, Illinois

h a trauma patient, time is the critical factor. A trauma care tem is described and requirements for trauma centers sented. A statewide network in Illinois is used to illustrate actual coordinated community resource reducing death and abilities among the critically injured. Case histories are in- ded.
-013 855

. Injuries

TUDY OF RESTRAINT USE AND EFFECTIVENESS

primary bibliographic entry see Fld. 5N.
-013 852

. Investigation And Records

LTIDISCIPLINARY ACCIDENT ANALYSIS. FINAL PORT

mi Univ., Coral Gables, Fla.
arty, Freeman, Haviland 1973 362p Rept. No. PB-225 656
ntract DOT-HS-060-2-294
IS

cident analysis, Traffic accidents, Driver performance, hway characteristics, Road conditions, Vehicle safety stan- ds, Statistical analysis, Accident causes, Multidisciplinary ns, Injury causes, Miami (Fla.), Accident investigation, crash phase, Crash phase, Postcrash phase, Accident case orts, Damage severity, Accident location, Accident factors, ie of accidents, Automobile models, Accident diagrams, ality causes, Human factors, Environmental factors, straint system usage, Injury severity, Age factor in ac- ents, Highway safety standards, Highway safety programs, ety program effectiveness, Sociological factors, Roadside ards, Defects, Driver error caused accidents, Accident es, Accident statistics

findings of 40 multidisciplinary vehicle accident analyses given, including comments, recommendations, and conclu- ns regarding human, vehicle, and environmental factors in- ved in vehicular collisions. Evaluation of federal motor vehi- safety standards and highway safety program standards, as y related to the in-depth analyses, is made. In addition, input certain conclusions and recommendations included a data rce of 135 in-depth accident investigations performed by the versity of Miami Multidisciplinary Accident Analysis Team.
-800 983

N MATEO COUNTY COMPUTERIZED ACCIDENT CORDS SYSTEM (CARES) SYSTEMS MANUAL. L 2. PROGRAMMING DOCUMENTATION

nford Res. Inst., Menlo Park, Calif.

For primary bibliographic entry see Fld. 4E.
HS-013 842

EPIDEMIOLOGICAL ASPECTS OF ALCOHOL IN DRIVER CRASHES AND CITATIONS

For primary bibliographic entry see Fld. 3A.
HS-013 868

SOLVING PROBLEMS IN AUTOMOTIVE SAFETY ENGINEERING AND BIO-MECHANICS WITH OPTICAL INSTRUMENTATION

Society of Photo-Optical Instrumentation Engineers, Redondo Beach, Calif.
For primary bibliographic entry see Fld. 5.
HS-013 873

DYNAMICS OF MOTORCYCLE IMPACT 1971-1973. VOL. 1: SUMMARY REPORT--RESULTS OF CRASH TEST PROGRAM AND COMPUTER SIMULATION. FINAL REPORT

Denver Univ., Colo.
For primary bibliographic entry see Fld. 5C.
HS-800 906

A FEASIBILITY STUDY OF IMPACT SURFACE PRESSURE GAUGING WITH DYE-FILLED MICROCAPSULES. FINAL REPORT

Southwest Res. Inst., San Antonio, Tex.
W. J. Astleford, G. R. Somerville, C. F. Schuetze, R. H. Hemion 1973 90p 10refs Rept. No. PB-225 577
Contract DOT-HS-024-2-490
NTIS

Gauges, Impact tests, Anthropmetry, Feasibility studies, Laminates, Dynamic loads, Dyes, Reliability, Pressure sensors, Drop tests, Static tests, Test equipment

The feasibility of using a composite sheet material comprised of dye-filled micro-capsules adhered to a flexible substrate as a contact surface load or pressure sensor in vehicle occupant impact testing was investigated. The theory of filled capsule failure under axisymmetric loading was explored and optimum formulations of capsule shell/fillers developed. A unique load calibration technique was developed utilizing photometric analysis of impacted test samples. The high potential of this investigative tool to supplement other measurements in impact testing was demonstrated.
HS-800 965

2. HIGHWAY SAFETY

MULTIDISCIPLINARY ACCIDENT ANALYSIS. FINAL REPORT

Miami Univ., Coral Gables, Fla.
For primary bibliographic entry see Fld. 1C.
HD-800 983

STUDIES OF TRAFFIC SAFETY BENEFITS OF ROADWAY LIGHTING

For primary bibliographic entry see Fld. 2E.
HS-013 861

MOTORWAY ACCIDENTS IN FOG AND DARKNESS

Transport and Road Research Lab., Crowthorne, Berks. (England)

H. D. Johnson 1973 18p 4refs Rept. No. PB-226 846, TRRL-LR-573
NTIS

Vehicle accidents, Fog driving, Night driving, Fatality causes, Day vs night accidents, Reduced visibility caused accidents, Highway lighting, Accident studies, Statistical analysis, England, Freeway driving, Accident rates, Accident severity, Injury rates, Accident location, Day of week

Analyses have been carried out to assess the accident problem in fog and in darkness on the main motorways in the country (M1, M2, M4, M5, M6) over the period 1969-1971; about 80 percent of all accidents in the motorway network have been covered and the various lengths have been broken down to make comparisons between different locations. Accidents in fog totalled 192 in the three year period, making up 4 percent of the total: 129 of these occurred during daylight hours. Accidents were on average more serious, with more casualties per accident, than those occurring in other weather conditions. Accidents in darkness totalled 1801 (39 percent of all accidents) in the same period: 1563 of these occurred on unlit motorways. Consideration of accidents on different lengths of road related to traffic volumes showed a range from 0.3 dark accidents per km per year on the more heavily trafficked.
HS-013 895

2. HIGHWAY SAFETY

THE WILLIAMSBURG CONFERENCE ON HIGHWAY SAFETY RESEARCH, WILLIAMSBURG, VIRGINIA, NOVEMBER 29-30, DECEMBER 1, 1972

67P Rept. No. SAE-SP-377
Corporate author

Highway safety, Conferences, Vehicle safety, Highway design, Crashworthiness, Roadside hazards, Traffic control, Injury prevention, Driver performance, Truck design, Bus design, Safety program effectiveness, Vehicle design, Injury severity, Injury causes, Injuries by body area

Papers are presented on: vehicle accident reduction factors; vehicle factors affecting occupant injury severity; roadway physical factors; system operational factors; occupant injury tolerance factors; driver performance factors; truck, bus and multipurpose vehicle safety; and safety effectiveness.
HS-013 887

2D. Design And Construction

ROADSIDE DELINEATION CONCEPTS: A NATIONAL STUDY

Highway Research Record n440 p57-68 (1973)
J. C. Yu, A. C. Arnn 1973 26refs Rept. No. PB-226 602
See serial citation

Pavement edge markings, Reflectorized road shoulder markings, Roadside hazards, Delineators (traffic), Highway design, Visibility, State action, Night driving, Economic factors

The need for national, uniform designs and applications of roadside delineation has long been recognized by traffic authorities. A comprehensive study was, therefore, undertaken to obtain a better understanding of present practices of roadside delineation and to further establish criteria for the selection of an optimum roadside delineation treatment at a given condition. In this study, an extensive literature review and a national survey of all state highway departments were conducted to form a state-of-the-art summary of roadside delineation concepts. Attempts to formulate a uniform selection process for roadside delineation treatments involved discussions of evaluation criteria and presentation of a suggested selection program. The results of this study provide updated and thorough knowledge of existing and proposed roadside delineation techniques.
HS-013 864

STUDIES OF PAVEMENT WEAR CAUSED BY STUDDED PASSENGER CAR TYRES ON STRAIGHT TEST TRACKS, THE 'BROMMA TRACK'

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
O. Andersson, B. Lilja 1972 29p 2refs Rept. No. PB-226 927, VTI-3A
Corporate author, Drottning Kristinas vag 25, S-114 28 Stockholm, Sweden

Pavement wear, Wear tests, Studded tires, Stockholm, Wear resistance, Correlation analysis, Proving ground tests, Road profiles, Radiometry, Bituminous concrete pavements, Portland cements, Concrete aggregates, Pavement tests

The wear of different pavements caused by studded tires under realistic conditions was determined on a test track built on the domestic airport of Stockholm (Bromma Airport). The relation between such wear and the wear measured in similar experiments in the road machine of the Road Research Institute was established. The wear was measured by geometric profiling, and at the same time a method based on the measurement of radioactive radiation absorption was tried. The results showed the same ranking of the different pavements with respect to wear on the Bromma test track as in the road machine. They also showed that the wear resistance is favored by enrichment of large aggregate, especially in the surface, of the wearing course, by increased binder hardness and by tar precoating of the aggregate at high temperatures.
HS-013 889

BIFROST - INSTRUMENT FOR AUTOMATIC DIGITAL RECORDING OF ROAD CROSS PROFILES

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
O. Andersson 1973 17p Rept. No. PB-226 928, VTI-22A
Corporate author, Drottning Kristinas vag 25 S-114 28 Stockholm, Sweden

Pavement condition, Sweden, Profile measurement, Studded tires, Deflection, Profilometers, Road profiles, BIFROST, Pavement wear, Computerized highway engineering techniques

For rational cross profiling of road surfaces, predominantly in order to measure rut depth due to permanent deflection and studded tire wear, a towed cross profilometer has been designed and built, capable of tracing road profiles up to 5 meters road width. The vertical coordinates are measured electrically by measuring the change of an electrical resistance, the coordinate being reproduced as an electrical voltage, measured by a digital voltmeter. The output of the voltmeter is fed into a data transmission unit and punched on a paper tape by a Facit tape punch. The tapes are fed into a large computer and evaluated by a basic Fortran computer program. If necessary, the program makes the computer plot the profile on the line printer. The total time of profiling is a few minutes, including positioning of the profilometer.
HS-013 891

LONGITUDINAL ROAD PROFILING BY MEASUREMENT OF COORDINATES AND SLOPES, A COMPARISON BETWEEN TWO DIFFERENT MEASURING SYSTEMS

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
O. Andersson, O. Nordstrom 1973 37p 8refs Rept. No. PB-226 925, VTI-25A
Corporate author, Drottning Kristinas vag 25 S-114 28, Stockholm, Sweden

Road conditions, Pavement surface texture, Stockholm, Measurement, Measuring instruments, Judgment, Correlation analysis, Highway characteristics, Fourier analysis, Profile measurement, Road profiles, Slopes, CHLOE meter

An investigation of the correlation between the motorist's judgment of the unevenness of the road surface and the root mean square slope as measured by the CHLOE meter was performed in the autumn of 1970 by rating and measurements of 23 test sections in the surroundings of Stockholm. These data and measurements made by means of a measuring system made at the institute and based upon the GM road profiler were used for a comparison of these two measuring systems. The correlation between the rating on one hand and the root mean square slope, the comfort index, the road holding index and the impact factor was studied. Further parameters derived from the CHLOE data were also studied as well as the Fourier spectra of the profiles according to both measuring systems. The correlation coefficients were about 0.7. Advantages and disadvantages of the two measuring systems are discussed.
HS-013 892

INFLUENCE OF ROAD UNEVENNESS ON ROAD HOLDING AND RIDE COMFORT

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
B. P. Sinha 1973 86p 63refs Rept. No. PB-226 926, VTI-28
Corporate author, Drottning Kristinas vag 25, S-114 28 Stockholm, Sweden

Pavement surface texture, Sweden, Road conditions, Driver road interface, Highway characteristics, Mathematical models, Vehicle road interface, Dual axles, Vehicle handling, Vehicle riding qualities

The influences of different wave lengths and amplitudes of the road unevennesses on road holding, ride comfort and impact factor (the stress imposed upon the road by a vehicle), as a function of vehicle speed, are investigated with the help of a mathematical model of two-axle and two-wheel vehicle with driver. The road holding problems are also studied with the help of one-wheel and one-axle vehicle model. Road surface, in this investigation, is considered to be a continuous sine wave. The investigation presents a range of significant wave lengths which ought to be measured by road surface measuring devices. The theories developed are compared with some experimental data.
HS-013 893

2E. Lighting

A TOTAL DESIGN PROCESS FOR ROADWAY LIGHTING

Highway Research Record n440 p1-19
N. E. Walton, N. J. Rowan 1973 27refs
Sponsored by the Highway Res. Board Com. on Visibility. Includes discussion and author's closure.

Highway lighting, Lighting design, Benefit cost analysis, Models, Visual perception, Night vision, Lighting warrants, Priorities, Highway characteristics

A lighting procedure based on information needs of night drivers is presented. A framework, consisting of information needs produced by various traffic facility characteristics, is established for development of the design process. The information needs are presented as the requirements to be satisfied by roadway lighting, and the traffic facility characteristics producing the needs serve as the justification or warranting conditions for the installation of lighting. The number of warranting conditions is used as the determinant of design criteria and the basis for cost-effective priorities. A priority model is presented based on lighting effectiveness, vehicles or people served, lighting intensity, roadway mileage over which the people are served, and total annual lighting costs. The priority model favors those facilities with high warranting conditions that can be lighted most economically. It is concluded that the total design process is a rational approach through which current practices can be revised.
HS-013 860

STUDIES OF TRAFFIC SAFETY BENEFITS OF ROADWAY LIGHTING

Highway Research Record n440 p20-8 (1973)
R. E. Stark 1973 15refs
See serial citation

Highway lighting, Night driving, Kansas City (Mo.), Syracuse (N.Y.), Connecticut, Los Angeles, Accident prevention, Accident rates, Urban highways, Light conditions caused accidents, Day vs night performance

Numerous laboratory studies have been conducted to relate illumination levels and driver performance at night. Selected field studies have been made to relate the ability of drivers to recognize certain objects on the roadway under different illumination conditions. The purposes of roadway lighting are to improve driver comfort and efficiency and to reduce accident frequencies. Studies have been made to correlate fixed roadway illumination and accidents, but the findings have not been entirely consistent for several reasons: inadequate sample sizes, lack of quality control on data collection, and inappropriate techniques of analysis. The purpose of this paper is to review some of the studies that have been made and some of the strengths and weaknesses of various study techniques.
HS-013 861

2G. Meteorological Conditions

MOTORWAY ACCIDENTS IN FOG AND DARKNESS

Transport and Road Research Lab., Crowthorne, Berks. (England)
For primary bibliographic entry see Fld. 1E.
HS-013 895

2I. Traffic Control

INTERNATIONAL CONFERENCE ON HIGHWAY SIGN SYMBOLOGY. PROCEEDINGS, WASHINGTON, D.C., JUNE 5-6, 1972

165P Rept. No. PB-224 641
Co-sponsored by International Road Federation, Washington, D.C.

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165P Rept. No. PB-224 641
Co-sponsored by International Road Federation, Washington, D.C.

NTIS

Sign standards, Highway signs, International signs, Sign uniformity, Symbols, Pattern recognition, Traffic signs, Conferences, Diagrammatic signs, Sign colors, Sign shape, Sign effectiveness, Shape coding, Sign recognition

The primary emphasis of the meeting was to determine those symbols and graphic features which have been effective in communicating with vehicle drivers, and to seek to establish a consensus on the design application, effectiveness, and uniformity of distinctive symbols for highway signs and to identify areas of needed research.
HS-013 849

TOWARD THE DEVELOPMENT OF A METHODOLOGY FOR EVALUATING HIGHWAY SIGNS BASED ON DRIVER INFORMATION ACQUISITION

Highway Research Record n440 p38-56 (1973)
V. D. Bhise, T. H. Rockwell 1973 11refs
See serial citation

Highway signs, Sign effectiveness, Information seeking, Data acquisition, Sign visibility, Sign location, Eye movements, Driver behavior, Sign design

This paper presents the findings of a research study conducted to develop a methodology for evaluating road signs by the use of an eye-marker camera as a primary research tool. The methodology attempts to evaluate a road sign by determining the degree of match between the sign-reading behavior of drivers and the characteristics of the signs, the highway, and the traffic situations. Data were collected on the eye movements of drivers under actual driving situations involving more than 400 different interstate highway signs. The data were analyzed by specially developed computer programs that also computed sign evaluation measures describing sign-reading behavior of the drivers. Further analyses showed that the sign evaluation measures were related to many factors associated with the characteristics of the signing, the driver, the highways, and the traffic situations. Understanding how various factors influence sign-reading behavior provides a basis for the implementation of the methodology for both the evaluation and the design of highway signing.
HS-013 863

3. HUMAN FACTORS

3A. Alcohol

CHARACTERISTICS OF CONVICTED DRUNKEN DRIVERS

Quarterly Journal of Studies on Alcohol v34 n3 p927-36 (1973)
R. D. Yoder, R. A. Moore 1973 16refs
See serial citation

Drinking drivers, Driver intoxication, Michigan Alcoholism Screening Test, Demography, Surveys, Blood alcohol levels, Statistical analysis, Convictions, California, Driver sex, Driver characteristics

Demographic data were obtained from 310 persons (206 first and 104 repeat offenders, 56 women) consecutively convicted in El Cajon, Calif. of driving while under the influence of alcohol. Driver characteristics regarding age, racial origin, marital status, education, and employment are given. Locale of drinking and type of liquor consumed as drawn from narratives submitted by 140 subjects are shown. Fatigue, stress, and concurrent use of other drugs were also involved. The Michigan Alcoholism Screening Test (MAST) was given to 269 subjects. Repeat offenders had significantly higher MAST scores (indicating likelihood of alcoholism) than first offenders; among first offenders, men had higher mean MAST scores than women but the proportion of men with scores indicating alcoholism was not significantly different from that of women. There was no correlation between age and MAST scores. Blood alcohol concentrations obtained from 346 men and 78 women first offenders and 131 men and 16 women repeat offenders showed significant differences between repeat and first offenders of both sexes, but not between men and women.
HS-013 835

DRINKING AND DRIVING IN SYDNEY: A COMMUNITY SURVEY OF BEHAVIOUR AND ATTITUDES. REPORT 1: AN OVERVIEW OF SEX AND AGE DIFFERENCES

New South Wales Dept. of Motor Transport, Sydney (Australia)
K. Freedman, M. Henderson, R. Wood 1973 58p 6refs Rept. No. 1/73, PB-226 589
Corporate author, Box 28, G.P.O., Sydney, N. S. W., Australia 2001

Drinking drivers, Surveys, Alcohol usage, Alcohol laws, Statistical analysis, Social drinking, Sex factors, Age factors, Sociological factors, Driver attitudes, Blood alcohol levels, Sydney (Australia)

Legislation introduced in New South Wales in 1968, laying down a legal limit for blood alcohol concentration, has had a disappointing effect on drinking-driving behavior. This survey was designed to examine what factors might be preventing the law's operating as an effective deterrent, and to obtain essential information for the planning of countermeasures to alcohol-related crashes. Interviews were conducted with 1197 men and women, aged between 17 and 69 years, distributed at random through the Sydney metropolitan area. The results suggest that ignorance and misinterpretation of the drink-driving law may be contributing to widespread opposition to it. Many men, especially young men, are resentful of what they see as an unrealistic attempt to set an arbitrary limit on their drinking.
HS-013 839

BREATH/ALCOHOL TESTS; CURRENTLY AVAILABLE DEVICES FOR QUANTITATIVE MEASUREMENT AND FIELD COLLECTION

45P 50REFS Rept. No. PB-226 587
Corporate author —0.95

Alcohol breath tests, Gas chromatography, Breathalyzers, Intoximeters, Alcoanalyzer, Alcometer, Alcotector, Intoxilyzer, Sober meter, Breath collection devices

For the convenience of law enforcement agencies and personnel and other interested parties, the Committee on Medicolegal Problems has collected and published this information on currently available devices for quantitative determination of blood alcohol level based upon testing the subject's breath samples. Also included here is information on devices for collection of breath-alcohol samples in the field for subsequent laboratory testing.
HS-013 840

EPIDEMIOLOGICAL ASPECTS OF ALCOHOL IN DRIVER CRASHES AND CITATIONS

Journal of Safety Research, v5 n3 p130-48 (Sep 1973)
P. M. Hurst 28refs Rept. No. PB-226 603
Contract Nonr-4423(00); N00014-71-C-0219; Grant MH-11294
See serial citation

Alcohol effects, Driver performance, Accident research, Blood alcohol levels, Drinking drivers, Driver intoxication, Accident risk forecasting, Accident causes, Alcohol laws, Alcohol usage, Fatalities, Grand Rapids, Evanston, Toronto, New York (city), Vermont, Statistical analysis, Alcohol usage deterrants, Epidemiology

In an amplification of previous work, a number of controlled studies of highway crashes and citations (with parallel roadblock samples) are treated in a consistent manner by a Bayesian technique, and relative probabilities of involvement are derived as functions of blood alcohol concentrations (BAC) and of other important predictor variables. Relative 'effectiveness' estimates for hypothetical BAC limits are derived from the assumption of 'perfect enforcement,' i.e., universal acquiescence to a given BAC limit. Estimated 'effectiveness' is compared on the basis of differences in driver population characteristics and in the chosen criterion. These results are supplemented by comparisons with uncontrolled studies of alcohol in fatal crashes. The role of self-reported drinking habits is considered as a moderator of hazard-BAC relationships and of enforcement implications. Some tentative implications for control practices are drawn, with recommendations for research.
HS-013 868

ALCOHOL INFLUENCES UPON CLOSED-COURSE DRIVING PERFORMANCE

Journal of Safety Research v5 n3 p149-64 (Sep 1973)
M. S. Huntley 1973 32refs
See serial citation

Alcohol effects, Driver performance, Driver reaction time, Coordination, Visual fields, Vehicle control, Blood alcohol levels, Driver fatigue, Driving tasks

Alcohol and driving research has ranged broadly in terms of adequacy of experimental design and technical sophistication. Some studies can be considered no more than demonstrational, whereas others provide a solid basis for much needed additional work. In almost all cases, alcohol has been shown to alter driving behavior. For example, it increases steering and velocity variation and the frequency of procedural errors, and decreases driving smoothness, stopping efficiency, cornering ability, and the extent of the visual field explored by the driver. Although the data indicate a high probability of impairment at BAC's between 0.05% and 0.75%, it cannot be assumed that all drivers are always impaired at these concentrations, for even BAC's as high as 0.13% are not sufficient to impair performance in all instances. The influences of alcohol are modified by driving skill, drinking experience, personality, the nature of the driving task, and sleep deprivation.
HS-013 869

ALCOHOL INFLUENCES ON DRIVING-RELATED BEHAVIOR: A CRITICAL REVIEW OF LABORATORY STUDIES OF NEUROPHYSIOLOGICAL, NEUROMUSCULAR, AND SENSORY ACTIVITY

Journal of Safety Research v5 n3 p165-84 (Sep 1973)
M. W. Perrine 1973 47refs
Contract DOT-HS-265-2-489 Grant PHS-RO1-17583
See serial citation

Alcohol effects, Laboratory tests, Balance (physiology), Visual perception, Driver performance, Nervous system, Alcohol effect on vision, Driver behavior, Neurophysiology, Visual acuity, Visual fields, Glare recovery, Critical flicker fusion, Blood alcohol levels, Drinking drivers

Understanding alcohol influences on more complex behaviors such as perception, attention, or driving performance can be facilitated by developing a relevant neurophysiological model. Two interrelated issues for such a model were reviewed: the actual site of alcohol effects in the nervous system; and the apparent biphasic effects of alcohol. Standing steadiness is a sensitive behavioral indicator of alcohol intoxication, but its validity for driving impairment is not yet conclusively established at blood alcohol concentrations (BAC) from 0.08% to 0.15%. Six aspects of vision are arranged in order of decreasing susceptibility to low and medium BAC's: dynamic visual acuity; adaptation and brightness sensitivity; critical flicker fusion; static visual acuity; glare resistance and recovery; and visual field. Only the first three aspects showed significant impairment at medium BAC's. Interrelations of variability and validity were discussed.
HS-013 870

LABORATORY STUDIES OF THE EFFECTS OF ALCOHOL ON SOME VARIABLES RELATED TO DRIVING

Journal of Safety Research v5 n3 p185-99 (Sep 1973)
H. Moskowitz 1973 56refs
See serial citation

Alcohol effects, Laboratory tests, Alcohol effect on vision, Tracking, Blood alcohol levels, Peripheral vision, Signal recognition, Attention, Driver performance, Drinking drivers, Visual acuity Visual perception

Alcohol influence on three essential driver performance areas was reviewed: vision, tracking, and division of attention. When examined separately, most visual and tracking studies failed to show an appreciable decrement due to alcohol. However, when these same functions were a component task within a requirement for joint performance of several functions, large performance decrements occurred at low blood alcohol levels. It was concluded that alcohol affects the ability to process appreciable quantities of information arriving from more than one source simultaneously, as is typical of driving. The conclusion was supported by additional evidence demonstrating alcohol-induced performance decrement of division of attention tasks and tasks requiring rapid processing of information. Drug dose studies demonstrated significant impairment of division of attention tasks by 0.02% blood alcohol concentration with nearly all subjects exhibiting effects by 0.03%.
HS-013 871

MOTIVATIONAL AND COGNITIVE EFFECTS OF ALCOHOL

Journal of Safety Research v5 n3 p200-21 (Sep 1973)
H. Barry, 3rd. 1973 59refs
Grant PHS-MH-13595
Supported in part by Research Scientist Development Award K2-MH-5921 from the National Inst. of Mental Health.
See serial citation

Alcohol effects, Laboratory tests, Alcohol depressant effect, Attention lapses, Fatigue (biology), Motivation, Driver behavior, Reckless driving, Learning rates, Speed, Driver reaction time, Driver emergency responses, Risk taking, Drinking drivers, Tracking

The contrasting depressant and disinhibitory effects of alcohol both can cause highway accidents. The depressant effect involves the motivational components of sedation and self-destructiveness and the cognitive components of memory loss and learning deficit. These give rise to inattention or fatigue; typical consequences are driving off the road or into an obstacle during routine driving and insufficient response to an emergency. The disinhibitory effect involves the motivational components of decreased fear and increased assertiveness and the cognitive components of impairment of self-criticism and dissociation from sober habits. These give rise to risk-taking or disorganiztion; typical consequences are speeding or risky maneuvers during routine driving and loss of control in an emergency. Although each motivational and cognitive component can be isolated conceptually and to some degree in laboratory research, several components are involved together in most highway accidents.
HS-013 872

ASAP--A VENTURE INTO THE DRINKING DRIVING PROBLEM

Highway User p16-9 (Sept 1973)
C. Cady
See serial citation

Alcohol Safety Action Projects, Safety programs, Drinking drivers, Alcohol usage deterrents, Public information programs, Accident prevention, Community goals, Nassau County (New York)

The Nassau County, N.Y., Alcohol Safety Action Program is evaluated for accomplishments under Federal funding. The success of the program has convinced the county and the public to continue and expand the program under local jurisdiction.
HS-013 890

THE EFFECT OF MARIHUANA DOSAGE ON DRIVER PERFORMANCE. FINAL REPORT

California Univ. Inst. of Transp. and Traf. Engineering
For primary bibliographic entry see Fld. 3G.
HS-800 951

3B. Anthropomorphic Data

DYNAMICS OF MOTORCYCLE IMPACT 1971-1973. VOL. 1: SUMMARY REPORT--RESULTS OF CRASH TEST PROGRAM AND COMPUTER SIMULATION. FINAL REPORT

Denver Univ., Colo.
For primary bibliographic entry see Fld. 5C.
HS-800 906

3C. Cyclists

THE EMERGING NEEDS OF BICYCLE TRANSPORTATION

For primary bibliographic entry see Fld. 5C.
HS-013 859

3D. Driver Behavior

THE EFFECTS OF RESTRICTED PREVIEW ON DRIVER STEERING CONTROL AND PERFORMANCE

Human Factors v15 n4 p421-30 (1973)
J. R. McLean, E. R. Hoffmann 1973 15refs Rept. No. PB-226 598
See serial citation

Sight distances, Field of view, Driver performance, Steering, Design of experiments, Spectral analysis, Tracking

Driver steering control and performance were studied for straight-lane driving under conditions of restricted far-sight distance. The far-sight distance necessary for the driver to adequately align the car was found to be 70 ft. and was independent of vehicle speeds of 20 and 30 m.p.h. With far-sight distances beyond 70 ft., there was no improvement in driver steering performance. Spectral analysis of steering wheel angle showed peaks in the frequency range 0.1 to 0.3 Hz. The value of the peak frequency was affected by allowed preview time, where preview time was far-sight distance divided by vehicle speed. Cross-correlation analysis suggested that the peaks were associated with the driver's control of vehicle heading angle. Higher frequency peaks were observed in the range 0.35 to 0.6 Hz. These peaks were more likely to occur under conditions of severely reduced preview.
HS-013 836

ALCOHOL INFLUENCES UPON CLOSED-COURSE DRIVING PERFORMANCE

For primary bibliographic entry see Fld. 3A.
HS-013 869

A PROFILE OF OUR YOUTH SAFETY PROBLEM

Highway User p8-11 (Sep 1973)
R. M. Calvin
See serial citation

Young adult drivers, Adolescent drivers, Age factor in accidents, Age factor in driving, Driver experience, Fatalities by age, High risk drivers, Motorcycle operators, Bicycle riders, Child injuries, Child pedestrians, Child safety, Child restraint systems, Drinking drivers

Problems associated with the full range of youthful traffic safety activities including driving, walking, riding, bicycle and motorcycle riding, and alcohol are reviewed. Statistics show that drivers in the 15 to 25 age range are involved in 35% of all traffic accidents although they are only 21.6% of the motoring population. The majority of these are male. Bicycle accidents show the same trends, but at earlier ages. Motorcycle accident rates are correspondingly high. Neither bicycle nor motorcycle riders are required to have special instruction, and licensing varies from state to state. Alcohol is becoming more of a problem with teenagers. These problems have led to new developments in safety education which, hopefully, will improve the performance of all highway users.
HS-013 897

3E. Driver Education

U. S. AIR FORCE DRIVER TRAINING COURSE NO. 1: ANALYSIS AND RECOMMENDATION. VOL. 1

American Univ., Washington, D.C.
J. A. Whittenburg, R. Pain, R. McBride, J. Amidei 1972 265p 256refs

porate author

ver education, Driver tests, Curricula, Instruction materials, tructors, Questionnaires, Driver education evaluation, Train- facilities, Driver skills, Automobile design, Automobile ntenance, Automobile performance, Bibliographies

s paper presents an analysis of and recommendations for ising the Air Force Driver Training Course 1. This paper y be viewed as a data and idea bank. It contains concepts, rature references, findings from the data collected on the Air ce Program and recommendations for revising the current rse. It is intended to be a general source document for use Air Force advisors, script writers, and producers. Further- re, this particular paper represents the initial effort to com- relevant data, literature references, and recommendations nputs for guiding the development of the revised Air Force gram. It is planned to add to this idea/data bank in the fu- , and to selectively distribute the new information to as- ed advisors, script writers, and producers.
-013 851

Driver Licensing

ARACTERISTICS OF CONVICTED DRUNKEN IVERS

primary bibliographic entry see Fld. 3A.
-013 835

TIONAL DRIVER REGISTER STUDY OF TERNATIVES. FINAL REPORT

P 56REFS Rept. No. PB-227 003
ntract DOT-HS-021-3-625
t. for 6 Mar-6 Dec 1973.
IS $11.25

ional Driver Register, Evaluation, Computer programs, ver license laws, Driver licensing, Problem drivers, Legal tors, Traffic records, Driver records, Driver license revoca- , Driver license suspension, Driver physical fitness, nomic factors, State action, Federal role, International fac- , Federal state relationships, State laws

ional Driver Register (NDR) managers have known for eral years that a complete computer program rewrite for the R is a basic and serious need. However, prior to any major rhaul of NDR computer programs an indepth study of what role of the NDR should be in the future of nationwide ver records communications was deemed essential. This dy identified four alternatives available to the NDR, how- r only one will meet the needs and requests of State Driver ensing Administrators. This alternative requires an alteration he NDR in terms of data content, category of users, and e of service. Requested is an on-line pointer/index system t would aid driver licensing officials in locating records on vers who have medical/physical limitations; records of viola- that require monitoring or recent suspensions; revocations, ials, withdrawals or cancellations in other jurisdictions. ft legislative proposals and legal research concerning driver ords exchange and requirements are an integral part of the dy report.
-801 017

3G. Drugs Other Than Alcohol

THE EFFECT OF MARIHUANA DOSAGE ON DRIVER PERFORMANCE. FINAL REPORT

California Univ. Inst. of Transp. and Traf. Engineering
H. Moskowitz, W. McGlothlin, S. Hulbert 1973 63p 36refs Rept. No. PB-225 634, UCLA-ENG-7341
Contract DOT-HS-150-2-236
Rept. for 1 Jul 1971--31 Aug 1972
NTIS

Driver performance, Drug effects, Marijuana, Driver reaction time, Driver monitoring, Driving simulation, Auditory perception, Visual perception, Manual performance, Signal recognition, Braking, Steering, Turning, Driving tasks, Tracking, Alcohol effects, Design of experiments, Attention

Performance in a complex driving simulator under 4 marijuana dose levels was examined. Car control and tracking appeared to be uninfluenced, but significant dose-related impairment was found on a visual recognition task simulating the search-and-recognition aspects of driving. An additional study of sensory signal detection supported the view that the perceptual deficit induced by marijuana involves a decrease in discrimination sensitivity.
HS-800 951

3I. Impaired Drivers

MOBILITY AIDS FOR THE SPINAL CORD INJURY PATIENT

Texas A and M Univ., College Station
P. H. Newell, Jr., W. A. Hyman, T. A. Krouskop, M. McDermott, Jr. 1973 6p 27refs
Contract V101(134-P-17)
Presented at the Automobile Engineering Meeting, Detroit, 14-18 May 1973.
SAE

Spinal cord injuries, Handicapped drivers, Vehicle modification, Entering and leaving automobiles, Manual performance, Self help devices, Transportation of handicapped, Paralysis, Hand operated controls

Some of the mobility problems faced by the spinal cord injury patient are presented in this paper. Existing automobile hand controls for the handicapped are discussed and current efforts at evaluation and standardization of this equipment are described. Design constraints are outlined for the development of new equipment to allow the more severely handicapped to drive.
HS-013 874

3K. Pedestrians

PEDESTRIAN ACCIDENT CHARACTERISTICS IN A ONE-WAY GRID

Highway Research Record n436 p1-7 (1973)
J. J. Fruin 1973 6refs Rept. No. PB-226 389
See serial citation

Pedestrian accidents, Pedestrian vehicle interface, Pedestrian visibility, Pedestrian characteristics, Accident location, Accident investigation, Intersections, New York (City), One way streets, Traffic conflicts, A pillars

The unique traffic configurations of one-way grid systems provide opportunities to statistically isolate and evaluate several aspects of pedestrian accident experience. One-way intersections have two conflict sides where the pedestrian must share the green with turning vehicles and two nonconflict sides where the pedestrian has an exclusvie green crossing phase. Investigation of 5 years of pedestrian accident reports for 32 contiguous one-way intersections in New York City shows that, of 172 reported intersection accidents, 69.7% occurred on the conflict side. Results of the study show that: exclusive pedestrian crosswalks independent of conflicts from turning vehicles have a lower pedestrian accident experience; backing into crosswalks should be discouraged through geometric design and stricter law enforcement; and more detailed research is required to determine the human dynamics involved in turning a vehicle, particularly the effects of the visual intrusion for the driver of the left front roof support.
HS-013 858

3L. Vision

LOW-CONTRAST VISION UNDER MESOPIC AND PHOTOPIC ILLUMINATION

Highway Research Record n440 p29-37 (1973)
T. W. Forbes, F. E. Vanosdall 1973 7refs
See serial citation

Night vision, Mesopic vision, Day vs night performance, Vision age changes, Contrast, Backgrounds, Glare, Photopic vision, Luminance, Vision tests, Visual acuity

The objective of this research was to obtain normative data for three measures of visual ability under simulated night-driving luminance (mesopic) and ordinary lighting (photopic) conditions, to compare the performance of different age groups, and to compare results with those of a previous study. A total of 371 subjects aged 16 to over 60 were given the Titmus standard acuity test and a Titmus low-contrast test at photopic (34 ft-L) and mesopic (0.4 ft-L) background luminance. They were also given the Allen night vision performance test with a 10% contrast target at 10 and 0.2 ft-L. Comparisons were made with a previous study in which the NVPT target was 50-60%. Average scores (thresholds) were higher (poorer) on the 10% contrast target than with the 50-60%, but lower contrast targets were seen on the low-contrast Titmus test. The results seem to indicate that the 10% contrast target test measured ability to see low-contrast targets against glare in both photopic and mesopic luminance and the Titmus low-contrast test measured a different type of low-contrast vision.
HS-013 862

4. OTHER SAFETY-RELATED AREAS

HIGHWAY SAFETY, A COLLISION OF VALUES

Highway User p20-3 (Sep 1973)
G. M. Bastarache
See serial citation

Highway safety, Accident prevention, Public opinion, Private sector, Federal role

The problem of accidents and traffic safety should be as important in the minds of the general public as the problems of drugs, diseases, and economic crises which stir citizens and organizations to take action. Governmental action is a step in the right direction, but is only a part of the support needed in safety programs. As a highway oriented society, the United States populace itself should become more actively involved in a traffic safety movement.
HS-013 896

4A. Codes And Laws

CRITERIA FOR EVALUATING VEHICLE IN-USE INSPECTION/MAINTENANCE IMPACT ON EMISSIONS AND ENERGY CONSERVATION

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p54-69
New Jersey State Dept. of Environmental Protection, Trenton
J. C. Elston 1973 27refs Rept. No. SAE-730522
Includes as an appendix, New Jersey State Dept. of Environmental Protection Air Pollution Control Code, Ch. 15: Control and Prohibition of Air Pollution from Light-duty Gasoline-fueled Motor Vehicles.
In HS-013 876

Emission control, Vehicle inspection, State action, New Jersey, Vehicle maintenance, Fuel economy, Carbon monoxide, Hydrocarbons, Vehicle age, Energy conservation, Vehicle operating costs, Maintenance costs, Air pollution laws

A generalized approach is taken looking at automobile emissions and energy problems from the vantagepoint of a state government regulatory agency. The auto industry's vast capability for technology, mass production, quality control, and marketing ability culminates at the dealership. Thereafter, the vehicle is often viewed by the user much differently. Initially, this paper attempts to overlay many of the different disciplines that formulate the final product. By examining a wide range of environmental ills, in part created by the automobile, and by analyzing how the automotive industry has adapted to past crises, the impending emission and energy questions are explored by using various economic, regulatory, and engine design trend indicators. Prospectives for analyzing these problems are demonstrated.
HS-013 885

4B. Community Support

ASAP--A VENTURE INTO THE DRINKING DRIVING PROBLEM

For primary bibliographic entry see Fld. 3A.
HS-013 890

POLICE TRAFFIC SERVICES HANDBOOK FOR GOVERNOR'S HIGHWAY SAFETY REPRESENTATIVES. FINAL REPORT

International Assoc. of Chiefs of Police, Inc., Gaithersburg, Md.
A. G. Johnson, N. Darwick, A. Smith, R. Sostkowski, F. Roberson, B. Pedersen 1973 235p refs Rept. No. PB-224 638
Contract DOT-HS-036-2-404
NTIS

Police traffic services, Highway safety organization management, Police law enforcement responsibilities, Traffic control, Emergency services, Police training, Planning, Manuals, Police motorist contacts, Accident investigation, Program evaluation, Questionnaires

e handbook provides the highway safety planner with a con-
ptualization of the purpose, goals, and objectives of a police
ffic services program. It is meant to serve as a basic frame of
ference for the planner relative to program definition, en-
rcement techniques and countermeasures, and should be of
nsiderable value to him in finding ways to upgrade the quality
d level of police traffic services.
S-800 928

E. Information Technology

AN MATEO COUNTY COMPUTERIZED ACCIDENT ECORDS SYSTEM (CARES) SYSTEMS MANUAL. OL 2. PROGRAMMING DOCUMENTATION

anford Res. Inst., Menlo Park, Calif.
L. Schlaefli, M. D. Bagley, D. W. Cook, V. M. Gallagher, H. Hutchins, S. E. Rowe 1972 210p Rept. No. SRI-TN-1077-2
rporate author

ccident records, Computer programs, Flow charts, Compu-
rized records management, Computerized Accident Records
stem, San Mateo County (Calif.), COBOL, Automated ac-
lent records, Manuals

is volume of the San Mateo County Computerized Accident
cords System (CARES) Systems Manual contains the details
the computer programming for CARES. The system is
esently operational on the IBM Model 40 computer and is
ogrammed completely in COBOL. This document is intended
r the computer professional who is completely familiar with
ndard data processing procedures and is trained in COBOL.
ction 2 contains system flow charts that show the sequence
application of the various programs. Section 3 presents a
ogram index that relates descriptive names with the ap-
opriate program numbers. The bulk of the document is con-
ined in Section 4 which provides a description of each
OBOL program used in CARES.
S-013 842

HTSA/SASI COOPERATIVE THESAURUS OF IGHWAY AND MOTOR VEHICLE SAFETY ITERATURE TERMS, FIRST ED.

ational Hwy. Traf. Safety Administration, Washington, D.C.
. L. Engel, N. K. Van Allen 1973 1044p Rept. No. PB-226 870
epared in cooperation with System on Automotive Safety In-
rmation, General Motors Research Lab.
TIS $19.00

ighway safety, Vehicle safety, Thesauri, Information
stems, Information retrieval, Nomenclature

rminology is presented for use in indexing literature in the
affic safety and vehicle safety fields. Subject areas covered
clude: vehicles, accidents, law enforcement, traffic engineer-
g and science, drivers, public transportation, transportation
d land use planning, and vehicle air pollution. Approximately
500 search terms and 800 cross references are given. Search
rms are structured to show broader, narrower, and related
rms as appropriate. Search terms were compiled from those
ed in the National Highway Traffic Safety Administration's
tomated retrieval system and General Motors Research
aboratories System on Automotive Safety Information's
anual file.
S-800 992

4H. Transportation Systems

TOTAL ENERGY SITUATION IN THE UNITED STATES

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p1-5
Department of the Interior, Washington, D.C.
D. R. Oliver 1973 Rept. No. SAE-730514
In HS-013 876

Energy consumption, Low sulfur coal, Nuclear energy, Energy conservation, International factors

In the past 20 years in the United States, the demand for energy has doubled, and it is expected to increase by 3.6% annually until the end of the twentieth century. This paper discusses the implications of the increased demand, and the resources needed to meet it. Nuclear power is seen as a partial answer, as is low-sulfur coal. Some untapped oil reserves are available in the United States, but oil will undoubtedly have to be imported to meet the demand. A concerted effort to conserve energy is needed to help hold imports to acceptable levels.
HS-013 877

MASS TRANSIT IMPACT ON ENERGY CONSUMPTION

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p46-53
Department of Transportation, Washington, D.C.
R. Husted 1973 14refs Rept. No. SAE-730521
In HS-013 876

Public transportation, Energy consumption, Urban transportation, Travel modes, Highway transportation, Rail transportation

The paper discusses the current structure of our transporation services and energy consumption, with particular emphasis on the public transit modes: bus, taxi, rapid transit, trolley, and commuter rail. Data are drawn from various sources and integrated to form an overall view of urban transit impact on energy consumption. Several option examples for conserving public and private transit energy are identified and evaluated for comparison purposes. Comments are included regarding other impacts concerning the optional examples selected.
HS-013 884

5. VEHICLE SAFETY

WILL THEY KILL THE CAR?

Motor News v56 n5 p12-3, 44-6 (Nov 1973)
I. Barnes 1973
See serial citation

Automobile usage, Vehicle air pollution, Automobile costs, Traffic congestion, Urban areas, Transportation regulation

A collection of criticisms levied on the car by people from all walks of life are presented. Critics attack a wide scope of problems including: pollution; traffic; costs; congestion; instrument of death; noise; and the amount of pavement required for streets and highways. Startling regulations proposed by the Federal Environmental Protection Agency for Boston, New York City, Pittsburgh, and other large cities are cited. The article raises the question of the extinction of the automobile, cites

some fallacies in proposed solutions to automobile problems, and concludes with a request for reader opinion.
HS-013 854

THE MEASUREMENT OF THE DYNAMIC PROPERTIES OF ELASTOMERS AND ELASTOMERIC MOUNTS

Society of Automotive Engineers, Inc., New York
B. M. Hillberry, ed. 1973 126p 61refs Rept. No. SAE-SP-375, ASTM-STP-535
Presented at SAE Automotive Engineering Congress, Detroit, 8-12 Jan 1973.
SAE

Test equipment, Vibration control, Vibration isolators, Elastomers, Body mounting, Engine mounts, Suspension systems, Dynamic tests, Damping, History

The symposium has been organized to present a complete picture of the dynamic testing of elastomers from history through to polymer development. It has been divided into six categories which serve as an outline for the symposium: history; measurement fundamentals; test equipment; equipment correlation; product design criteria; and polymer development.
HS-013 867

SOLVING PROBLEMS IN AUTOMOTIVE SAFETY ENGINEERING AND BIO-MECHANICS WITH OPTICAL INSTRUMENTATION

Society of Photo-Optical Instrumentation Engineers Proceedings v34 (1973)
Society of Photo-Optical Instrumentation Engineers, Redondo Beach, Calif.
P. Brown, ed., L. Patrick, ed. 1973 149p refs Rept. No. PB-226 591
Proceedings of a seminar-in-depth held at Dearborn, Mich., 20-22 Nov 1972.
Corporate author

High speed photography, Safety engineering, Biomechanics, Impact tests, Television, Photography, Pneumatic tires, Vehicle lighting, Conferences, Holography, Data analysis, Eye movements, Glare reduction, Accident research, Vehicle safety, Nondestructive tests, Tire tests

Photo instrumentation in automotive safety engineering and biomechanics has gone through several distinct phases in arriving at its present state of maturity. This seminar discusses the fundamentals, applications, instrumentation, and problem solving aspects of photography applied to automotive safety engineering.
HS-013 873

THE WILLIAMSBURG CONFERENCE ON HIGHWAY SAFETY RESEARCH, WILLIAMSBURG, VIRGINIA, NOVEMBER 29-30, DECEMBER 1, 1972

67P Rept. No. SAE-SP-377
Corporate author

Highway safety, Conferences, Vehicle safety, Highway design, Crashworthiness, Roadside hazards, Traffic control, Injury prevention, Driver performance, Truck design, Bus design, Safety program effectiveness, Vehicle design, Injury severity, Injury causes, Injuries by body area

Papers are presented on: vehicle accident reduction factors; vehicle factors affecting occupant injury severity; roadway physical factors; system operational factors; occupant injury tolerance factors; driver performance factors; truck, bus and multipurpose vehicle safety; and safety effectiveness.
HS-013 887

VEHICLE SAFETY RESEARCH INTEGRATION SYMPOSIUM

370P 344REF Rept. No. PB-226 923
Presented by Research Institute's Office of Operating Systems Research, Office of Vehicle Structures, at a meeting held at Washington, D.C. on 30-31 May 1973. Includes HS-013 426 thru HS-013 441, HS-014 034 thru HS-014 036, and HS-820 280.
GPO

Vehicle design, Structural analysis, Interior design, Restraint systems, Vehicle handling, Automatic recorders, Biomechanics, Accident survivability, Motorcycle safety, Pedestrian safety, Tire research, Brake inspection, Tests, Models, Simulation, Sensors, Evaluation, Occupant protection, Trucks

Technical papers presented at the symposium include six on structures and exteriors, five on handling dynamics, three on biomechanics, and six on vehicle systems.
HS-820 306

5A. Brake Systems

DESCRIPTION OF FRICTION TEST VEHICLE NO. 5 OF THE NATIONAL SWEDISH ROAD AND TRAFFIC RESEARCH INSTITUTE

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
O. Nordstrom, E. Ohlsson 1971 12p Rept. No. VTI-2
Corporate author, Drottning Kristinas vag 25 S-114 28, Stockholm Sweden

Test equipment, Instrumented vehicles, Friction tests, Brake tests, Measuring instruments, Staten Vag- och Trafikinstitut, Stockholm (Sweden)

The friction test vehicle no. 5 of the National Swedish Road and Traffic Research Institute was developed by the Institute and came into use in 1960. However, since then several modifications have been carried out on the equipment. The measuring device consists of a test wheel mounted on a truck. The test wheel is connected to the driving wheels of the lorry by means of transmission units. As the truck moves forward, the test wheel is forced to operate at a reduced peripherical speed and thus develops a braking force, which is measured.
HS-013 894

MVSS 105a - HYDRAULIC BRAKE SYSTEMS - VEHICLE TEST PROGRAM. FINAL REPORT

National Hwy. Traf. Safety Administration, Washington, D.C.
R. W. Radlinski 1973 220p Rept. No. PB-225 863
Report for May-Jul 1973.
NTIS

Hydraulic brakes, Performance tests, Vehicle safety standards, Braking, Automobiles, School buses, Pickup trucks, Motor homes, Four wheel drive vehicles, Brake tests, Test facilities, Test equipment, Brake fade, Power brakes, Brake boosters

e vehicles were tested to Motor Vehicle Safety Standard . 105a, 'Hydraulic Brake Systems,' to determine the degree rent production (1973) braking systems comply with the 1976 del year requirements. A large school bus, a motor home, a npact pickup truck, a four-wheel drive carryall and a pas-ger car were instrumented and utilized as test vehicles. This ort presents a description of the test program and an analy-of the results. It includes: descriptions of test vehicles, in-umentation and the test site; detailed data sheets; vehicle formance summaries and graphs; and a discussion of results.
-800 978

. Cycles

IE EMERGING NEEDS OF BICYCLE ANSPORTATION

ghway Research Record n436 p8-18 (1973)
T. Germano, P. H. Wright, R. G. Hicks, P. H. Sanders 1973
efs Rept. No. PB-226 588
e serial citation

ycle lanes, Bicycle usage, Bikeways, Bicycle safety, recasting, Laws, Bikeway planning, International factors, deral role, State action

s expected that bicycle sales will equal if not pass automo-e sales in 1973. Adults are rediscovering the virtues of the ycle: health, recreation, and ecology. The 50 million bicycles l estimated 73 million riders need safe, efficient, and enjoya-bike paths. Various levels of government are attempting to dress this need by developing design criteria for bikeways. s paper reviews some of the bicycling activities in the ited States at various levels of government, summarizes ex-ng planning and design critieria, and recommends an ap-ach for future planning efforts. It is hoped that this informa-n will provide answers to some basic questions and point the y for additional research relating to the emerging needs for eways.
-013 859

NAMICS OF MOTORCYCLE IMPACT 1971-1973. OL. 1: SUMMARY REPORT--RESULTS OF CRASH ST PROGRAM AND COMPUTER SIMULATION. NAL REPORT

nver Univ., Colo.
W. Bothwell, R. E. Knight, H. C. Peterson 1973 53p Rept. . DRI-2621, PB-226 592
ntract DOT-HS-126-1-186; Ref: FH-11-7307
pt. for Jul 1971-Mar 1973.
IS

torcycle accidents, Accident simulation, Motorcycles, Im-t tests, Equations of motion, Mathematical models, Motor-le operators, Motorcycle restraint systems, Anthropometric nmies, Degrees of freedom, Computerized simulation, Vehi-dynamics, High speed photography

series of fourteen motorcycle crash tests using 50% hropometric dummy riders has been performed. The dummy er was instrumented with either 11 or 13 accelerometers. h-speed movie cameras were used to record the crash event. arallel effort has developed a digital computer simulation of three dimensional post-crash motion of a nine degree-of-edom (DOF) motorcycle and an attached rigid rider. The mo-cycle model has six rigid body and three internal degrees of freedom. This report summarizes the tests and results are tabulated and illustrated with photographs.
HS-800 906

DYNAMICS OF MOTORCYCLE IMPACT 1971-1973. VOL. 2. MOTORCYCLE CRASH TEST PROGRAM. FINAL REPORT

Denver Univ., Colo.
H. C. Peterson, P. W. Bothwell 1973 257p Rept. No. PB-225 710
Contract DOT-HS-126-1-186
Prepared in cooperation with Caliber Design Ltd., Stratford-on-Avon (England). Report for Jul 1971-Mar 1973.
NTIS

Motorcycle accidents, Motorcycle safety, Impact tests, Accident simulation, Vehicle motorcycle collisions, Injury research, Safety engineering, Anthropometric dummies, Motorcycle operator injuries, Motorcycle passenger injuries, Helmets, Air bag restraint systems, Injury causes, Angle impact tests, High speed photography, Human acceleration tolerances, Occupant kinematics, Motorcycle design

A series of 14 motorcycle crash tests using 50% anthropometric dummy riders has been performed. The dummy rider was instrumented with either 11 or 13 accelerometers. Five high-speed movie cameras were used to record the crash event. The results obtained from this series of tests are reported, including identification of hazardous aspects of current motorcycle design and accident configurations, data on the mechanisms of head injury in motorcycle accidents, particular hazards presented to the motorcyclist by automobile design, and guidelines for safety performance standards for motorcycles and their components. The crash test program investigated nine motorcycle accident situations. Detailed documentation of the impact events experienced by the dummy rider (or the dummy passenger) in the form of Arriflex 25 millisec interval photos, time histories of resultant head, chest, and pelvic accelerations, and tables of peak single-axis and resultant g-levels are given. A list of proposed safety standards for motorcycles is included.
HS-800 907

REQUIREMENTS ANALYSIS AND FEASIBILITY STUDIES FOR AN EXPERIMENTAL SAFETY MOTORCYCLE. FINAL REPORT

American Machine and Foundry Co., Santa Barbara,
J. Bartol, G. D. Livero, N. R. Hirsch 1973 111p Rept. No. PB-225 866
Contract DOT-HS-257-3-585
NTIS

Motorcycle safety, Experimental safety motorcycles, Antiskid brakes, Tire traction, Headlamp tests, Motorcycle visibility, Windshield design, Rear viewing devices, Security systems, Fuel systems, Fenders, Safety engineering, Feasibility studies, Antilocking devices, Stopping distance, Tire road conditions, Polarized headlamps, Rearview mirrors, Theft prevention, Fire prevention

The basic purpose of this effort was to determine the desirability and costs of near term safety improvements in motorcycles and to prepare preliminary specifications and a recommended development plan for a near term experimental safety motorcycle. The program covered the following areas of safety: antilock brake, improved traction tires, improved headlamp system, conspicuity, windshield, rear vision, security system, fuel system and flexible fenders.

HS-800 972

5D. Design

CAN DIESEL CARS HACK IT ON AMERICAN ROADS? YOU BET THEY CAN

For primary bibliographic entry see Fld. 5F.
HS-013 857

ALTERNATIVE POWERPLANTS

Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Fld. 5O.
HS-013 882

WE CARE ABOUT YOU AND THE CAR YOU CONTRIVE

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p70-3
Conservation Foundation, Washington, D.C.
S. Howe 1973 5p Rept. No. SAE-730523
Includes discussion.
In HS-013 876

Automotive industry, Energy conservation, Vehicle design, Environmental factors, Taxation

This paper discusses the present automobile situation in the United States, in terms of environmental damage, excess weight and low fuel economy, and how the public is forced to deal with traffic. The paper stresses that the automotive engineering industry can alleviate some of the problems by designing and marketing smaller, more efficient cars and by being attuned to the effects of present-day automobiles. Several suggestions are made, including a miles-per-gallon tax and environmental stickers on new cars, next to price stickers.
HS-013 886

INFLUENCE OF ROAD UNEVENNESS ON ROAD HOLDING AND RIDE COMFORT

Statens Vag- och Trafikinstitut, Stockholm (Sweden)
For primary bibliographic entry see Fld. 2D.
HS-013 893

AGGRESSIVENESS OF CRASHWORTHY CAL MOD 2D AND AMF INC. ESV FRONT STRUCTURES. FINAL REPORT

50P Rept. No. PB-224 984, 2310-72-16
Contract DOT-OS-10187
Report for Jul 1971-Aug 1972
NTIS

Barrier collision tests, Vehicle vehicle impact tests, Crashworthiness, Experimental vehicles, Deformation, Crush tests, Damage severity, Data acquisition, Plymouths, Rear end impact tests, Test facilities, High speed impact tests, Low speed impact tests, Energy absorbing front structures

A test program was conducted to obtain empirical data on vehicle response and intrusion when impacting the rear end of a conventional sedan with the modified front ends of two structurally improved vehicles; a fixed-force system having a 40G square wave response (the CAL Mod 2D) and a velocity-sensitive hydraulic front end (the AMF Inc. ESV energy management system). Three 40 mph and two 60 mph tests were conducted to obtain data for the evaluation of the aggressiveness of the two systems. Test data analysis showed that total system crush was essentially the same in the 60 mph tests, and that average occupant compartment accelerations were generally lower with the velocity sensitive system as the striking vehicle. Also, the struck vehicle experienced less crush when impacted with this system. Total event time was increased by 15% in the 60 mph test, with the velocity-sensitive system evidencing a better occupant environment in the striking vehicle by providing longer occupant ride down times.
HS-800 911

AUTOMOTIVE TAPE RECORDER. VOL. 1. DESIGN AND PRELIMINARY DEVELOPMENT. FINAL REPORT

AVCO Corp., Greenwich, Conn.
C. M. Conlon, Jr. 1973 169p Rept. No. PB-225 782
Contract FH-11-7603
Report for Jun 1970-Feb 1972
NTIS

Tape recorders, Impact tests, Magnetic tapes, Instrumented vehicles, Motion sensors, Electronic devices, Pulse code modulation, Data processing, Accident investigation, Automobiles, Laboratory tests, Sensors, Precrash phase, Measuring instruments, Pressure transducers, Vibration tests, Temperature endurance tests

The requirements for a sensing and recording device for use in passenger vehicles are listed with a discussion of how the requirements are met with a prototype unit which was fabricated and assembled. A complete description of the electronic circuits for conditioning signals from remote transducer is included with a signal processing technique for recording data on a magnetic tape system. Laboratory tests on critical elements of the recording devices are discussed and the results of the tests are noted to show feasibility of the design.
HS-800 952

AUTOMOTIVE TAPE RECORDER. VOL. 2. DEVELOPMENT TEST REPORT. FINAL REPORT [REV.]

168P Rept. No. AVSD-0135-72-CR-Vol-2
Contract FH-11-7603
Supersedes HS-800 806. Report for Feb-Nov 1972.
NTIS

Tape recorders, Performance tests, Vibration tests, Road tests, Electromagnetic interference, Low temperature, High temperature, Humidity, Temperature endurance tests, Accelerometers, Sensors, Pressure transducers, Speed sensors, Potentiometers, Magnetic tapes, Shock (mechanics), Performance characteristics, Test equipment, Test facilities

The development tests on the Automotive Tape Recorder are discussed. Five tape recorder assemblies with transducers were subjected to shock, vibration, humidity, high and low temperatures, electromagnetic interference, and rough road tests. A matrix of the test series and the sequence of the tests are included. Each test is described and the results of each test are discussed individually. The test hardware is illustrated throughout the report. The Automotive Tape Recorder Assembly, using magnetic tape deck P/N 325025, meets all the performance specifications over the tested environmental conditions and is recommended for use.
HS-800 953

AUTOMOTIVE TAPE RECORDER. VOL. 3. ASSEMBLY, INSPECTION AND PRE-CALIBRATION. FINAL REPORT [REV.]

49P 09Contract FH-11-7603 Rept. No. AVSD-0135-72-CR-Vol-3
Supersedes HS-800 807. Report for Feb-Nov 1972.
NTIS

Tape recorders, Calibration, Manufacturing inspection, Manufacturing, Performance tests, Sensors, Test equipment, Magnetic tapes, Pressure transducers, Accelerometers, Specifications, Instrumentation, Flow charts

Procedures are outlined for assembly, pre-assembly, and in-process inspection, pre-calibration, and acceptance testing of the Automotive Tape Recorder. The assembly facility, requirements, and procedures for production of quantities from 5,000 to 50,000 units are discussed.
HS-800 954

AUTOMOTIVE TAPE RECORDER. VOLUME 4. INSTALLATION, MAINTENANCE AND REMOVAL. FINAL REPORT [REV.]

AVCO Corp., Greenwich, Conn.
R. C. Baker 1973 76p Rept. No. AVSD-0135-72-CR-Vol-4, PB-225 785
Contract FH-11-7603
Supersedes HS-800 808. Report for 15 Feb-24 Nov 1972.
NTIS

Tape recorders, Instrumented vehicles, Instruction manuals, Accelerometers, Pressure transducers, Speed sensors, Potentiometers, Braking recorders, Sensors, Wiring, Maintenance, Automobile models, Electronic monitoring systems, Steering systems

The Automotive Tape Recorder (ATR) is an electro-mechanical system designed to sense, measure, and record several parameters within an automobile. In a collision, the ATR will provide a permanent record of acceleration in three axes, steering wheel motion, front brake line pressure, and vehicle speed for the period immediately prior to and during the collision. This volume discusses and illustrates in detail the installation procedures for the ATR. Installation is shown for the Ford LTD, Ford Torino, Plymouth Fury, Chevrolet Impala, American Motors Ambassador, and American Motors Matador. The installation instructions include mechanical and electrical interfaces with the vehicles and checkout procedures to assure proper installation. Procedures for the removal of the equipment from the vehicles and for the maintenance of the equipment are also included.
HS-800 955

AUTOMOTIVE TAPE RECORDER. VOL.5 DATA PROCESSING AND POST CALIBRATION. FINAL REPORT

AVCO Corp., Greenwich, Conn.
D. LeFevre, R. D'Auteuil 1973 43p Rept. No. PB-225 786, AVSD-0135-72-CR-Vol-5
Contract FH-11-7603
Supersedes HS-800 809. Report for 15 Feb--24 Nov 1972.
NTIS

Tape recorders, Impact tests, Accident investigation, Motion sensors, Pulse code modulation, Automobiles, Calibration, Computers, Precrash phase, Crash phase, Speed, Braking forces, Steering, Acceleration, Magnetic tapes, Data processing, Flow charts, Pressure transducers

This volume discusses procedures in detail for processing the digital data recorded on magnetic tape by the Automotive Tape Recorder, AVCO Part Number 323600. The recorded data includes pre-crash and crash measurements of speed, brake pressure, steering wheel motion and accelerations in three axes. The format of the recorded data is presented in graphic form. Typical equipment for processing and displaying the data is identified. Characteristics of transducers for vehicle measurements are discussed for use in post-calibration of the instruments.
HS-800 956

ACCIDENT AVOIDANCE EVALUATION OF FORD EXPERIMENTAL SAFETY VEHICLE. FINAL REPORT

152P Rept. No. PB-225 928, 2310-73-104
Contract DOT-HS-046-2-468
Rept. for Jan-Jul 1973.
NTIS

Safety cars, Vehicle performance, Design standards, Experimental automobiles, Compliance tests, Accident avoidance, Automobile safety characteristics, Brake performance, Steering tests, Ford Motor Co., Automobile handling, Returnability tests, Vehicle acceleration tests, Field of view, Wheel slip, Rollover tests, Vehicle characteristics, Eyellipse, Yaw

Results of tests and evaluations performed on this vehicle are given. Two of the four tasks are reported on: evaluation of design requirements, including the vehicle's weights, dimensions, passenger capacity, and overall body style definitions, and accident avoidance evaluations, including data on the vehicle's braking, handling, steering, overturn immunity, engine, and visibility capabilities. Test results are compared to design requirements, and the compliance or noncompliance shown.
HS-800 976

AUTOMOTIVE DISC RECORDER ENVIRONMENTAL TESTS. FINAL REPORT

Southwest Res. Inst., San Antonio, Tex.
T. D. Dunham, D. C. Scheidt 1973 114p refs
Contract DOT-HS-024-3-731
Rept. for 21 Jun-12 Oct 1973.
NTIS

Recorders, Performance tests, Vibration tests, Electromagnetic interference, Humidity, Shock (mechanics), Temperature endurance tests, Environmental factors, High temperature, Low temperature, Test equipment, Impact sleds, Acceleration pulses

The Model 35500 Automotive Triaxial Disc Recorders were subjected to temperature, shock, vibration, humidity, salt-fog, and electromagnetic environments to test the performance of the recorders prior, during, and after being exposed to these environmental conditions. Particular consideration was given to dimensional change of the stylus-to-disc clearance, any variation in recorder rotational speed, and any recorder failures during environmental testing.
HS-801 015

5F. Fuel Systems

MORNING VEHICLE-START EFFECTS ON PHOTOCHEMICAL SMOG

Environmental Science and Technology v7 n10 p917-23 (Oct 1973)

Field 5—VEHICLE SAFETY

Group 5F—Fuel Systems

J. R. Martinez, R. A. Nordsieck, A. Q. Eschenroeder 1973
20refs Rept. No. PB-203 872
Contract EPA-EHSD-71-22
NTIS

Coldstarts, Exhaust emissions, Smog, Photochemical reactions, Emission tests, Los Angeles, Carbon monoxide, Vehicle air pollution, Vehicle age, Ozone, Nitrogen oxides

The influence of cold-start vehicle emissions on air quality is investigated using a photochemical/diffusion model. Both the time and space distribution of cold starts are examined. A day from an October 1968 Los Angeles smog episode serves as a baseline for determining meteorological and chemical parameters for the model. Emission inputs consist of vehicular and stationary sources for 1968, 1971, 1974, and 1980. Stagnant conditions in the central Los Angeles basin are assumed. Cold-start emissions are found to increase CO peak concentration from 9-13% while increases in ozone and nitrogen dioxide are practically insignificant. Decentralizing the starts geographically produced no significant differences from the case of uniformly distributed starts, either in pollutant loadings or in air quality.
HS-013 834

REDUCING AIR POLLUTION BY AUTOMOBILE INSPECTION AND MAINTENANCE, A PROGRAM ANALYSIS

For primary bibliographic entry see Fld. 5I.
HS-013 838

CONVERSION OF MOTOR VEHICLES TO GASEOUS FUEL TO REDUCE AIR POLLUTION

14P 3REFS Rept. No. PB-226 599
Corporate author

Fuels, Vehicle air pollution, Liquified petroleum gases, Compressed natural gas, Air pollution control, Engine conversion, Hydrocarbons, Carbon monoxide, Nitrogen oxides, Economic factors, Urban areas, Sulfur oxides

The position of the Environmental Protection Agency on the conversion of existing vehicles to gaseous fuels to reduce air pollution emissions from motor vehicles is summarized. Substantial reduction in emissions from new motor vehicles powered by gasoline engines is expected by the mid-1970's, but the urgent need for improvment of air quality in certain metropolitan areas has focused attention on the possibility of conversion to gaseous fuels of motor vehicles already in use in such metropolitan areas. The conclusions expressed herein are based on presently available technology and on the probable availability of gaseous fuels at motor vehicle refueling stations during the next five years.
HS-013 848

THE EFFECT OF SPEED ON AUTOMOBILE GASOLINE CONSUMPTION RATES

Federal Hwy. Administration, Washington, D.C.
E. M. Cope 1973 8p Rept. No. PB-226 600
Corporate author

Fuel consumption, Gasoline mileage, Speed, Automobile performance, Acceleration, Vehicle weight, Air conditioning usage, Test equipment

The purpose of the study was to measure, as nearly as possible under practical operating conditions, how much operating speeds affect gasoline usage. The cars used were selected t cover a range of weights and were 1970 or later year model Each had been operated more than 3,000 miles, and with or exception, none were specially tuned or modified for the tes The tests give a clear and conclusive picture of the existence very substantial increases of fuel consumption in the upp speed ranges - above 50 mph, and they give a strong indicatio of the magnitude of those increases.
HS-013 850

CAN DIESEL CARS HACK IT ON AMERICAN ROADS? YOU BET THEY CAN

Popular Science v203 n5 p22, 26, 30, 32, 36 (Nov 1973)
J. P. Norbye, J. Dunne 1973
See serial citation

Diesel engines, Fuel consumption, Diesel engine exhaust emi sions, Diesel engine noise, Smoke, Diesel fuels, Idling, Engi speeds, Engine performance, Odors, Engine maintenance, D rability

Aspects of diesel cars are discussed leading to the conclusio that they are preferable to gasoline powered engines of toda and probably to the catalytic converted ones of tomorro Points discussed include: fuel consumption; idling ability; noi levels; smoke emission; odor; performance; and a summary other advantages and disadvantages.
HS-013 857

ADVANCED AUTOMOTIVE POWER SYSTEMS CONTRACTORS COORDINATION MEETING, ANN ARBOR, MICHIGAN, JUNE 5-7, 1973. SUMMARY REPORT

281P Rept. No. LPPSD-TIE-1, PB-226 391
Corporate author

Low emission vehicles, Rankine cycle engines, Gas turbine e gines, Diesel engines, Electric vehicles, Stirling engines, Fu economy, Steam engines, Turbine engines, Vehicle air poll tion, Air pollution control, Conferences, Reciprocating engine Casting

Papers of the conference are presented. Low pollution syste discussed are mainly the Rankine engine and gas turbin Shorter presentations are given on the Stirling engine, electr propulsion, and diesel engines. Countries represented were t U.S.A., Italy, Germany, England, Japan, and Sweden.
HS-013 865

ENERGY AND THE AUTOMOBILE

77P Rept. No. PB-226 590, SAE-SP-383
Includes HS-013 877 thru HS-013 886. Presentations made at t National Automobile Engineering Meeting, Detroit, 15 Ma 1973.
SAE

Energy consumption, Fuel rationing, Gasoline shortages, E haust emission control, Gasoline consumption, Fuels, Publ transportation, Automobile modification, Vehicle inspectio Environmental factors

The general purpose of the forum was to consider the dire and indirect factors affecting the supply and demand for energ to fuel automobiles. Five papers dealing specifically with t gasoline supply and demand situation and five dealing wi more general aspects of the automobile energy situation are i cluded.

HS-013 876

IMPACT OF AUTOMOTIVE EMISSIONS REGULATIONS ON GASOLINE DEMAND

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p6-14
Mobil Oil Corp., New York; Mobil Res. and Devel. Corp., New York
D. H. Clewell, W. J. Koehl 1973 26refs Rept. No. SAE-730515
In HS-013 876

Gasoline consumption, Automobile usage, Automobile design, Vehicle air pollution, Exhaust emission standards, Consumer demand forecasting, Gasoline quality, Nitrogen oxides, Compact automobiles, Diesel engines

This paper reviews trends in car design and usage that have affected gasoline consumption in the past and discusses such factors as emission controls that will affect future consumption, especially in light-duty vehicles. Between 1973-1985, demand is expected to increase 50%, and perhaps 70% if the present 1976 oxides of nitrogen emission standard stays in effect. The paper explores ways to moderate this demand, in terms of relaxation of emission standards, increased use of smaller cars, and increased use of public transportation.
HS-013 878

CURRENT AND FUTURE TRENDS IN UNITED STATES GASOLINE SUPPLY

HS-013 876, Energy and the Automobile (SP-383) New York, 1973 p15-20
Standard Oil Co. of California, San Francisco; Chevron Res. Co., Richmond, Calif.
E. J. Cahill, A. L. Grossberg 1973 Rept. No. SAE-730516
In HS-013 876

Gasoline shortages, Fuels, Energy conservation, Refineries, Consumer demand forecasting

This paper presents the outlook for gasoline supply and demand in the United States as now envisioned. It includes discussions of present oil supplies as well as future ones, of refinery capacity and its projected shortage, and of gasoline consumption and supply through 1976 and beyond. Without government and public support, it is doubtful that the necessary refinery capacity can be accomplished.
HS-013 879

FUEL CONSUMPTION TRENDS IN TODAY'S VEHICLES

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p21-4
Ford Motor Co., Dearborn, Mich.
H. C. MacDonald 1973 5refs Rept. No. SAE-730517
In HS-013 876

Fuel economy, Gasoline consumption, Emission control, Vehicle weight

This paper discusses fuel economy in present automobiles and shows that as vehicle weight has increased and emission controls have become more stringent, fuel economy has deteriorated and will probably continue to do so. Weight is seen as the significant factor in reduction of fuel economy and performance, and smaller cars are seen as a possible solution to the problem.
HS-013 880

ENERGY AND THE AUTOMOBILE--GENERAL FACTORS AFFECTING VEHICLE FUEL CONSUMPTION

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p25-30
Chrysler Corp., Detroit, Mich.
G. J. Huebner, Jr., D. J. Gasser 1973 Rept. No. SAE-730518
Includes discussion.
In HS-013 876

Fuel consumption, Engine modification, Fuel economy, Vehicle weight, Vehicle size

Factors influencing fuel economy and acceleration are examined for an intermediate car. Changes in engine efficiency and displacement, compression ratio, torque converter, transmission, axle ratio, aerodynamic drag, tires, accessories, vehicle weight, and emissions controls are examined. When practical, the effects of 10% changes are analyzed. Comparisons are also made with a subcompact and a luxury vehicle.
HS-013 881

SYNTHETIC FUELS FOR TRANSPORTATION AND NATIONAL ENERGY NEEDS

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p37-45
Institute of Gas Technology, Chicago, Ill.
D. P. Gregory, R. B. Rosenberg 1973 24refs Rept. No. SAE-730520
In HS-013 876

Fuels, Energy consumption, Gasoline shortages, Coal, Nuclear energy, Solar powered vehicles

The United States petroleum supplies cannot keep up with the demands made upon them by the use of automobiles. Increased importation of oil is not a satisfactory long-term solution. Supplies of coal, nuclear, and solar energy, however, are abundant. We suggest that 'clean' fuels could be synthesized from these resources by using these abundant materials. This paper examines the possibilities of making methanol, ethanol, hydrogen, and ammonia for use as vehicle fuels. In the short term, methanol and methanol-gasoline blends appear attractive. In the long term, hydrogen is ideal if its handling problem can be solved.
HS-013 883

5I. Inspections

REDUCING AIR POLLUTION BY AUTOMOBILE INSPECTION AND MAINTENANCE, A PROGRAM ANALYSIS

Journal of the Air Pollution Control Association v23 n10 p845-52 (Oct 1973)
S. I. Schwartz 17refs
Presented as Paper no. 72-47 at the Annual meeting of the Air Pollution Control Assoc. (65th), Miami Beach, Fla., Jun 1973.
See serial citation

Air pollution control, Automobile maintenance, Vehicle inspection, Inspection effectiveness, Feasibility studies, Inspection procedures, Benefit cost analysis, Maintenance costs, Repair costs, Vehicle air pollution

A comprehensive analysis of inspection maintenance programs is proposed. Effectiveness, costs to the state and to the individual, distribution of cost and benefits, and political and ad-

ministrative feasibility are examined. Effectiveness is probably the most difficult aspect to project because of changes in design and consequences of maintenance repair on performance. However, using sensitivity analysis, substantial reductions in hydrocarbons and carbon monoxide are foreseen, along with a slight increase in NOx emissions. Politically the program is feasible but depends on public support which in turn is sensitive to direct repair costs. Administratively the program suffers greatly if private repair facilities do not have enough adequately trained mechanics. It is concluded that the benefits of an inspection program do not convincingly outweigh the high costs, possible adverse social impacts, and public opposition and that other alternatives should be examined.
HS-013 838

5J. Lighting Systems

DETECTABILITY DISTANCES IN SOME AUTOMOBILE HEADLIGHT EXPERIMENTS

National Aeronautical Establishment, Ottawa, Ont. (Canada)
P. Huculak 1973 44p 5refs Rept. No. LTR-ST.599, PB-226-390
Corporate author

Headlamp tests, Visibility, Sight distances, Contrast, Luminance, Backgrounds, Headlamp glare, Field tests, Sight distances, Environmental factors

Experiments were conducted to determine headlight visibility. Contrast threshold measurements are reported. Problems are presented by complex patterns of roadway brightness, atmospheric effects and the determination of a contrast multiplier or field factor.
HS-013 841

INTERCHANGEABILITY OF VEHICLE HEADLAMPS. FINAL REPORT.

Southwest Res. Inst., San Antonio, Tex.
R. H. Hemion 1973 27p 21refs Rept. No. PB-225 869, AR-906
Contract DOT-HS-024-3-683
NTIS

Headlamps, Vehicle lighting, Headlamp design,Lamp housings, Headlamp standards

The problems of allowing other than round headlamps on motor vehicles are discussed with particular reference to effects on replacement of defective lamps in service, inspection and safety of operation. Recommendations and guidelines for proliferation of lamp types are made.
HS-800 966

5N. Occupant Protection

THE SEATBELT EDUCATION PROJECT

Ontario Ministry of Transp. and Communications, Downsview (Canada)
L. P. Lonero, W. T. Wilson, D. M. Ish 1974 20p 19refs Rept. No. RR-187
Corporate author

Seat belt campaigns, Seat belt usage, Child safety education, Safety program effectiveness, Children, Instruction materials

The use of seatbelts is a highly desirable countermeasure to injury and death in highway traffic accidents. Unfortunately, however, seatbelt use has remained at low levels despite considerable effort and expense to increase their use through ma media campaigns. Literature on these matters is brief reviewed. Studies suggest that a more fruitful approach to i creasing seatbelt use would involve longer, more intense co tacts tailored for specific audiences. In seeking a more effecti public-information approach, we decided to develop a prot type seatbelt educational program for school children and test its effect on seatbelt use. The prototype program consiste of a lengthy, varied session in which the children actively pa ticipated. Grade Two and Three children in selected schoo were exposed to the program in groups of 75 to 100. Immediat ly after the program, parent's seatbelt use was observed in tw different areas. Parents of 'treated' children used their belts substantially higher rates than other parents. Implications ar future directions of the program are discussed.
HS-013 833

A STUDY OF RESTRAINT USE AND EFFECTIVENES

HIT Lab Reports v3 n8 p1-25 (Apr 1973)
F. Preston, R. Shortridge 1973
See serial citation

Restraint system, Restraint system effectiveness, Driv characteristics, Demography, Injury prevention, Injury seve ty, Statistical analysis, Injury causes, Seat belt fastening war ing systems, Injuries by body area

Three related investigations are summarized: (1) a determin tion of the demography of restraint system use; (2) a cor parison of the incidence and severity of injuries for restrai system users and nonusers; and (3) a comparison of the i cidence and severity of injury from those various areas in th vehicle that were contacted by the occupants. For the first pa of the study, restraint usage rates were compared for ag groups, seat locations, and sex for selected mass accident file maintained by HSRI. Further comparisons were made for di ferent values of speed, type of highway, and driver's physiolo ical condition, using the CPIR file.
HS-013 852

SEARCHLIGHT ON SEATBELTS

Autosafe v2 n3 p12-7 (Mar 1973)
Anonymous 1973
See serial citation

Seat belts, Human factors engineering, Inertia reels, Seat be usage, Seat belt positioning, Seat belt assembly anchorage Seat belt design, Seat belt standards, Seat belt usage laws

Automotive seat and shoulder belts are discussed from a critic point view in this Australian article. The following complain are presented: siting of anchorages; belt webbing (twists easily ease of adjustment (very difficult); reach of controls; identific tion of seat belt parts; fastenability; dirt; no protection f reclined position; lack of adjustability to all sizes of wearer and no possibility of detection of dangerous wear after crash. short treatment of future regulations is given.
HS-013 853

AIR BAGS VS. BELTS: NEXT MONTH YOU CAN CHOOSE

Popular Science v203 n5 p84-6, 156, 160 (Nov 1973)
H. Shuldiner 1973
See serial citation

Air bag restraint systems, Seat belts, Air bag inflation devices, Air bag caused injuries, Side impact collisions, Front end collisions, Sensors

A pro air bag article is presented expounding on their virtues and explaining how they work. Experimental tests are performed and instances of real life deployment cited. Sensors are located on the bumper and under the top of dashboard; these inflate the air bags in a crash with speed of inflation and degree of inflation dependent on crash severity. Pros and cons of the seat belt vs. air bag are then overviewed with no final conclusions reached.
HS-013 856

A FEASIBILITY STUDY OF IMPACT SURFACE PRESSURE GAUGING WITH DYE-FILLED MICROCAPSULES. FINAL REPORT

Southwest Res. Inst., San Antonio, Tex.
For primary bibliographic entry see Fld. 1C.
HS-800 965

5O. Propulsion Systems

ALTERNATIVE POWERPLANTS

HS-013 876, Energy and the Automobile (SP-383), New York, 1973 p31-6
Environmental Protection Agency, Washington, D.C.
J. J. Brogan 1973 1ref Rept. No. SAE-730519
In HS-013 876

Engine comparisons, Fuel consumption, Fuel economy, Vehicle weight

A review is made of available data on fuel economies of the current internal combustion engine-powered automobiles and of those with alternative powerplants. Comparisons of fuel economies of all these engine systems are made on the basis of the vehicle weight/engine displacement, and the vehicle weight alone. The thermal efficiencies are also compared.
HS-013 882

5Q. Safety Defect Control

MOTOR VEHICLE SAFETY DEFECT RECALL CAMPAIGNS REPORTED TO THE NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION BY DOMESTIC AND FOREIGN VEHICLE MANUFACTURERS, APRIL 1, 1973 TO JUNE 30, 1973

42P Rept. No. PB-223 556
GPO

Automobile recall campaigns, Defects, Truck recall campaigns, Tire recall campaigns, Foreign vehicles, Defective vehicles, Defect correction, Bus recall campaigns, Motorcycle recall campaigns, Trailer recall campaigns, Suspension systems, Brake systems, Recall campaigns, Defective tires

This tabulation of safety defect recall campaigns includes the make and model, model year, description of the defect requiring manufacturer's corrective action, number of vehicles recalled, date of notification, and identification number. Automobiles, trucks, trailers, motor homes, motorcycles, heavy duty vehicles, suspension systems, brakes, tires, and buses are included. Status of domestic and foreign campaigns completed as of Mar 31 is also included.
HS-820 293

5R. Steering Control Systems

DYNAMIC BEHAVIOR OF TWO LINKED-TWIN-AXLE LORRY SUSPENSION SYSTEMS: A THEORETICAL STUDY

Transport and Road Res. Lab., Crowthorne, Berks. (England)
J. Page 1973 43p 6refs Rept. No. PB-224 010, TRRL-LR-581
Corporate author

Suspension systems, Tire road contact forces, Dual axles, Suspension system design, Truck performance, Vehicle road interface, Pavement loading, Dynamic loads, Mathematical models, Linkages, Computer programs, Damping, Speed, Equations

Two mathematical models of part-vehicles having axles linked by two common types of compensating arrangement are described. The dynamic loads applied to the road as the models pass over simple road surface irregularities are calculated. It is shown that the dynamic behavior of the models is similar and that there is a range of speed (about 20-60 km/h for the particular cases considered) in which both models, when passed over a bump, apply significantly greater dynamic loads to the road than a model having an unlinked suspension. In this speed range therefore the linkages increase the potential of the vehicles to damage the road structure. The suspension systems require adequate damping to minimize their response to road surface irregularities and it is shown that one model is inherently less well damped than the other, and that the dynamic loads applied to the road by both models can be significantly reduced by adding shock absorbers. It is also shown that reducing the tire stiffness reduces the dynamic loads applied to the road by both models.
HS-013 888

5T. Trucks And Trailers

DYNAMIC LOAD ASPECTS OF TRUCK SIZE AND WEIGHT

Michigan Dept. of State Highways, Lansing
J. R. Darlington 1973 33p 5refs Rept. No. R-858, PB-226 393
Prepared in cooperation with the Federal Hwy. Administration.
Corporate author

Trucks, Vehicle weight, Vehicle size, Dynamic loads, Tire inflation pressure, Truck tires, Pavement loading, Calibration, Computerized simulation, Tire force measurement, Transducers, Strain gauges, Accelerometers, Laboratory tests, Field tests, Tire pavement interface

This study had two goals: to find an effective force transducer to measure vehicle induced dynamic loads; and to perform a dynamic force survey for various trucks and highway types. Tire air pressure variation was selected as a measure of force since calibrated tires would facilitate large scale dynamic force surveys. Difficulty in developing this transducer led to concentration of the study toward this major goal. Two problems were successfully solved: development of a vital bypass filter system which permitted use of highly sensitive differential pressure cells; and development of methods to instrument trucks with accelerometers and strain gauges to sense actual force for calibration of the tires. Transducer development led to two significant discoveries: adiabatic conditions must be maintained during calibration of the tire; and the pressure cell bypass filter must be at standard tire pressure when setting the time constant.
HS-013 837

5V. Wheel Systems

TYRE FAILURES ON PART OF M5 MOTORWAY

Transport and Road Res. Lab., Crowthorne, Berks. (England)
R. W. Lowne 1973 13p 4refs Rept. No. PB-224 774
Corporate author

Tire failures, Statistical analysis, Retreaded tires, Tire loads, Tire failure caused accidents

The West Mercia Constabulary collected data on 310 tire failures observed between junctions four and eight on the M5 motorway between September and November 1971. The data are analyzed in this report. Retreaded tires were found to fail more often than original treaded tires and heavy goods vehicles were found to suffer tire failure more frequently than private cars, although this tended to lead to fewer accidents than with cars. About 2% of all tire failures led to injury accidents and 3% to all accidents that were reported. The results are in agreement with a previously reported result that about one sixth of all injury accidents have tire failure as a major contributary factor. The risk of failure increased with tire wear for car tires.
HS-013 866

TIRE REINFORCEMENT NEEDS OF THE FUTURE

Monsanto Textiles Co., New York
A. B. Beindorff 1973 9p 3refs Rept. No. SAE-730496
Presented at the Automobile Engineering Meeting, Detroit, 14-18 May 1973.
SAE

Tire industry, Consumer demand forecasting, Statistical analysis, Bias tires, Bias belted tires, Radial tires, Steel belted tires, Steel wire, Tire cords, Tire materials

This paper is concerned with the forecasting of the tire industry, as seen by a supplier, with special emphasis on the possible future of steel as a reinforcement material and on some of the forces which may effect steel usage in the next decade. In making its forecasts of future reinforcement needs, Monsanto placed primary emphasis on projecting market shares by tire construction type: bias, bias belted, or radial, and on the reinforcement material of choice in each market segment. Current trends and forces shaping the future of the tire industry are analyzed, and graphs are presented of automotive production and a variety of tire projections from 1972-1982.
HS-013 875

TIRE SPECIAL. ARE YOU UP ON TIRES?

Driver v7 n5 p5-9, 25 (Oct 1973)
Anonymous
See serial citation

Bias tires, Bias belted tires, Radial tires, Snow tires, Steel belted tires, Tire characteristics, Tire cords, Tire labeling, Tire maintenance

The article describes types of tires: bias-ply, belted, and radial. It gives recommendations for usage and care for longer tire life and economy.
HS-013 898

TIRE TRACTION GRADING PROCEDURES AS DERIVED FROM THE MANEUVERING CHARACTERISTICS OF A TIRE-VEHICLE SYSTEM. VOLS. 1 AND 2 COMBINED

Michigan Univ., Ann Arbor. Hwy. Safety Res. Inst.
P. Fancher, L. Segel, C. MacAdam, H. Pacejka 1973 158p 8refs
Rept. No. HSRI-71-129, PB-225 561
Contract NBS-1-35715
NTIS

Tires, Tire traction, Skid resistance, Tire treads, Dynamic braking, Tire wear, Lateral force, Longitudinal force, Tire slip motion, Braking forces, Turning, Tire grading, Tire tests, Tire performance, Shear stress

Discussed aspects of tire traction grading procedures are: wet-surface longitudinal and lateral shear-force data for 10 tires which differ in construction and/or state of treadwear; rank difference correlations between tire traction quality rankings derived from tire testing and tire rankings derived from tire-vehicle system tests; a comprehensive tire shear force model and a mathematical method for fitting tire data; and results from analyses and simulation studies of tire-vehicle system performance in J-turns and locked wheel diagonal braking stops. With regard to ranking tires, the findings of this study indicate that: tire tests should be made on at least two types of surfaces; both longitudinal and lateral traction should be considered; and the rate of change of longitudinal force with velocity and the rate of change of lateral force with tire load, along with the maximum longitudinal and lateral force capability, be used to rate tire traction performance.
HS-800 813

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